Recommendation of the Utah Association of Mathematics Teacher Educators 2014
Elementary Teacher Preparation in Mathematics

Background: The preparation of preservice elementary teachers could and should be improved. For too long, elementary teachers have taken coursework that has not prepared them in the mathematics that they are required to teach to elementary children. As a result of this mismatch between preparation and the requirements of elementary classroom teaching, the Conference Board of the Mathematical Sciences produced a report titled: The Mathematical Education of Teachers II (2012). This report outlines recommendations for changes in the preparation of preservice elementary teachers to better prepare them to take on the challenge of teaching high quality mathematics to the elementary students they teach. As the Mathematical Education of Teachers (MET) II document states: *A major advance in teacher education is the realization that teachers should study the mathematics they teach in depth, and from the perspective of a teacher.* As the MET II document argues: *It is not enough for teachers just to study mathematics that is more advanced than the mathematics they will teach.*

The Mathematical Education of Teachers (MET) II Recommendations: Recommendation 1 of the MET II document states: *Prospective teachers need mathematics courses that develop a solid understanding of the mathematics they will teach. Prospective teachers need to understand the fundamental principles that underlie school mathematics, so that they can teach it to diverse groups of students as a coherent, reasoned activity and communicate an appreciation of the elegance and power of the subject. Thus, coursework for prospective teachers should examine the mathematics they will teach in depth, from a teacher's perspective.* Recommendation 5 of the MET II document suggests that mathematics educators and mathematicians work collaboratively to develop preservice teachers' understanding of the mathematics that they will teach.

The MET II document also makes specific recommendations about the coursework required of preservice elementary teachers: *Prospective elementary teachers should be required to complete at least 12 semester-hours on fundamental ideas of elementary mathematics, their early childhood precursors, and middle school successors… Thus, this report recommends that before beginning to teach, an elementary teacher should study in depth, and from a teacher's perspective, the vast majority of K–5 mathematics, its connections to prekindergarten mathematics, and its connections to grades 6–8 mathematics.* The MET II document goes on to state that *teachers will also need courses in mathematical pedagogy*.

The MET II document further outlines the content of the 12 semester hours:
Programs designed to prepare elementary teachers should include 12 semester hours focused on a careful study of mathematics associated with the CCSS (K–5 and related aspects of 6–8 domains) from a teacher's perspective… Number and operations, treated algebraically with attention to properties of operations, should occupy about 6 of those hours, with the remaining 6 hours devoted to additional ideas of algebra (e.g., expressions, equations, sequences, proportional relationships, and linear relationships), and to measurement and data, and to geometry. When possible, program designers should consider courses that blend the study of content and methods… It bears emphasizing that familiar mathematics courses such as college algebra, mathematical modeling, liberal arts mathematics, and even calculus or higher level

courses ***are not an appropriate substitute for the study of mathematics for elementary teachers****, although they might make reasonable additions.* (emphasis in the original document)

Committee Recommendation: Based on these guidelines from the Conference Board of the Mathematical Sciences report titled *The Mathematical Education of Teachers II* (2012), the representatives of this committee make the following recommendations for revisions to the minimum requirements for preservice elementary teacher licensure in the state of Utah:

1) The committee recommends that preservice elementary teachers be required to take at least 12 semester hours, and optimally 15 hours, focused on a careful study of mathematics associated with the CCSS (K–5 and related aspects of 6–8 domains) from a teacher's perspective. These 12-15 hours should blend the study of content and methods and be focused on developing teachers' mathematical knowledge for teaching elementary school mathematics.

2) The committee recommends that, of the 12-15 hours preservice teachers are required to take, at least 6 semester hours should include number and operations, treated algebraically with attention to properties of operations, and at least 6 semester hours should include additional ideas of algebra (e.g., expressions, equations, sequences, proportional relationships, and linear relationships), measurement, data, and geometry associated with the CCSS (K–5 and related aspects of 6–8 domains) from a teacher's perspective. As suggested in MET II, these 12-15 hours should blend the study of content and methods and be focused on developing teachers' mathematical knowledge for teaching elementary school mathematics.

3) The committee recommends that mathematics courses such as college algebra, mathematical modeling, liberal arts mathematics, calculus, or higher level courses may be reasonable additions to a preservice elementary teacher's preparatory coursework, but that these courses are not an appropriate substitute for the hours study of mathematics for elementary teachers. Where appropriate, newly developed courses among the 12-15 semester hours may be designed to replace current Quantitative Literacy, Quantitative Intensive, or General Education requirements.

Based on the spirit of collaboration between mathematics educators and mathematicians recommended in the MET II document, a statewide committee made up of representatives of Utah's IHEs will determine an appropriate course sequence for the 12-15 semester hours of mathematics education preparation for preservice elementary teachers. Each IHE will then design 12-15 semester hours of mathematics education preparation for preservice elementary teachers (K-5/6) that blends the study of content and methods and meets the recommendations in this document. IHEs will determine how to allocate each of the 12-15 semester hours within colleges and departments at the IHE to ensure that the hours study of mathematics for elementary teachers blends content and methods and provides prospective students with expert instructors best qualified to teach the required coursework.

Committee Membership:
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